Radio Frequency Interference Measurement System

For the
Quarterly Review of the NASA/FAA Joint University Program for Air Transportation Research

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Project Sponsor: FAA

Purpose of the RFIMS

Determine and isolate Radio Frequency Interference (RFI) problems with the National Airspace System (NAS) communication and navigation facilities through in-flight analysis of signal data collected on an airborne platform.

Radio Frequency Interference (RFI) Team Capabilities

- **Airport Airspace Analysis Modeling**
  - **Prediction of interference levels within ILS/VOR/VHF Communication service volumes.**
- **Technical support for international frequency coordination.**
- **Airborne RF data collection**
  - **Characterization of RF environment through measurement of signal levels and noise floor.**
  - **Mitigation of ILS/VOR/VHF Comm/GPS RF interference by determining frequency, type, direction and ultimately location and cause.**

Airborne Capabilities

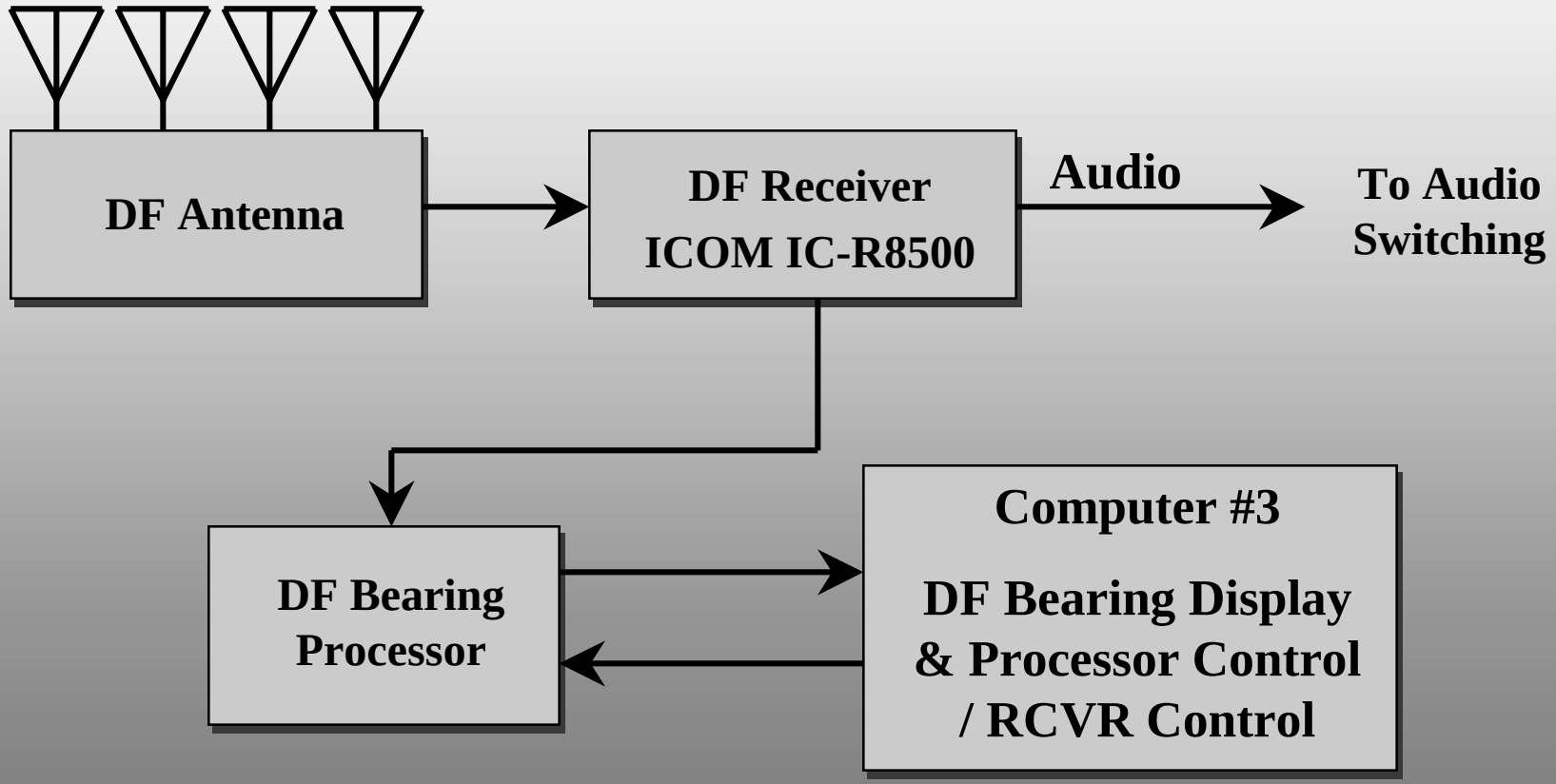
Avionic Engineering Center's Cessna Centurion (C210T) on a Radio Frequency Interference Mission.

- **Spectrum Analysis**
- **Direction Finding (DF)**
- **Radio Frequency Scanning**
- **GPS Mapping**
- **Signal generation & filtering**
- **Audio & video data recording**

Breakdown of Airborne Capabilities

- **Radio Direction Finding**
- **Signal Analysis and Measurement**
- **Audio Comparison & Recording**

Radio Direction Finding



Four-aerial Adcock Antenna

DF Receiver

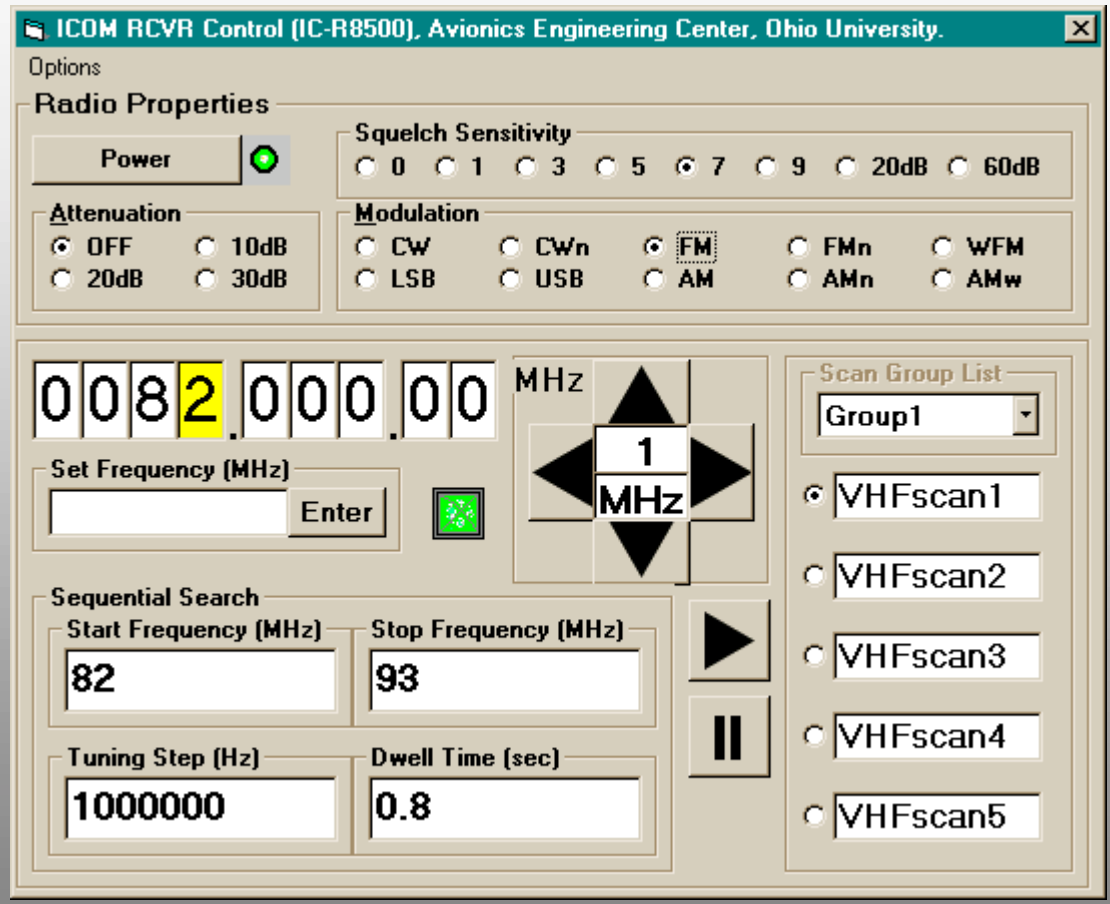
ICOM IC-R8500 Communications Receiver

http://www.icomamerica.com/receivers

Frequency Range:

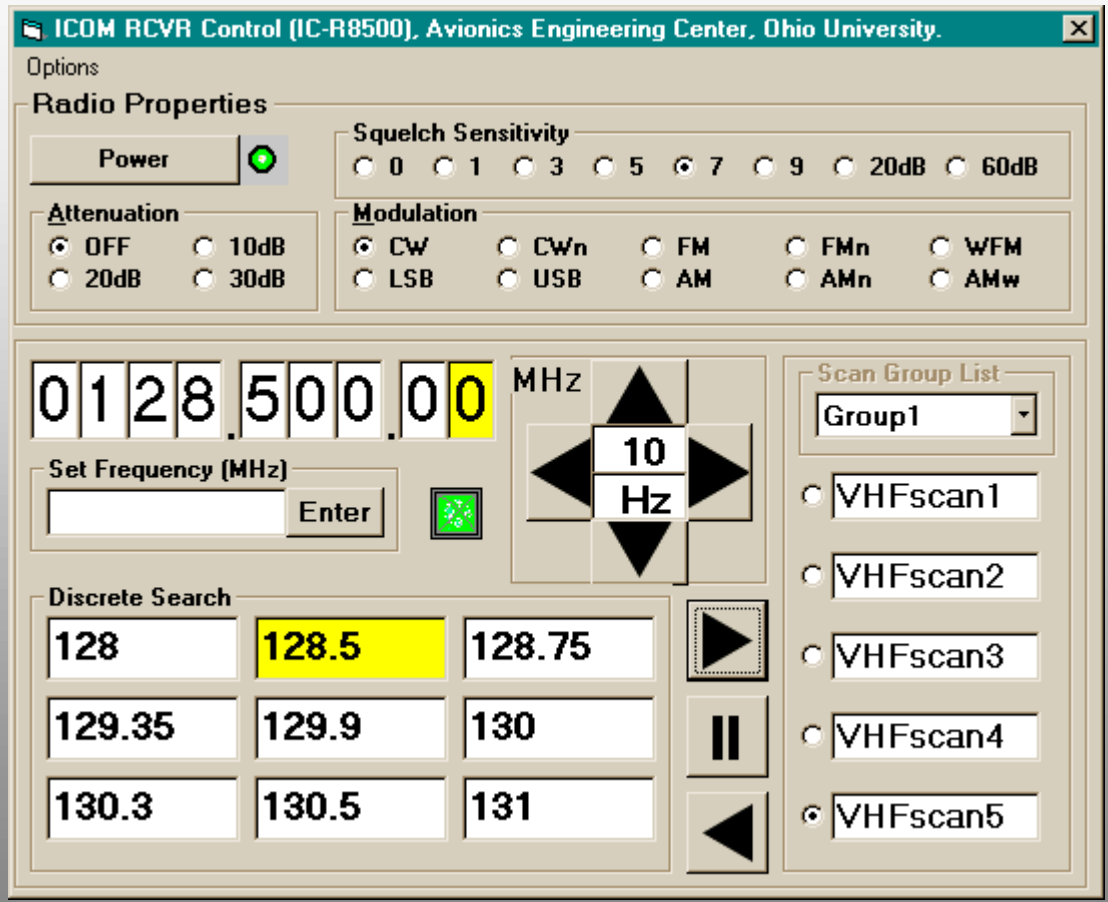
- **0.10000 – 823.99999 MHz**
- **849.00001 – 868.99999 MHz**
- **894.00001 – 1999.99999 MHz**

Software Control for the Receiver



Software Receiver Control in Sequential Search Mode.

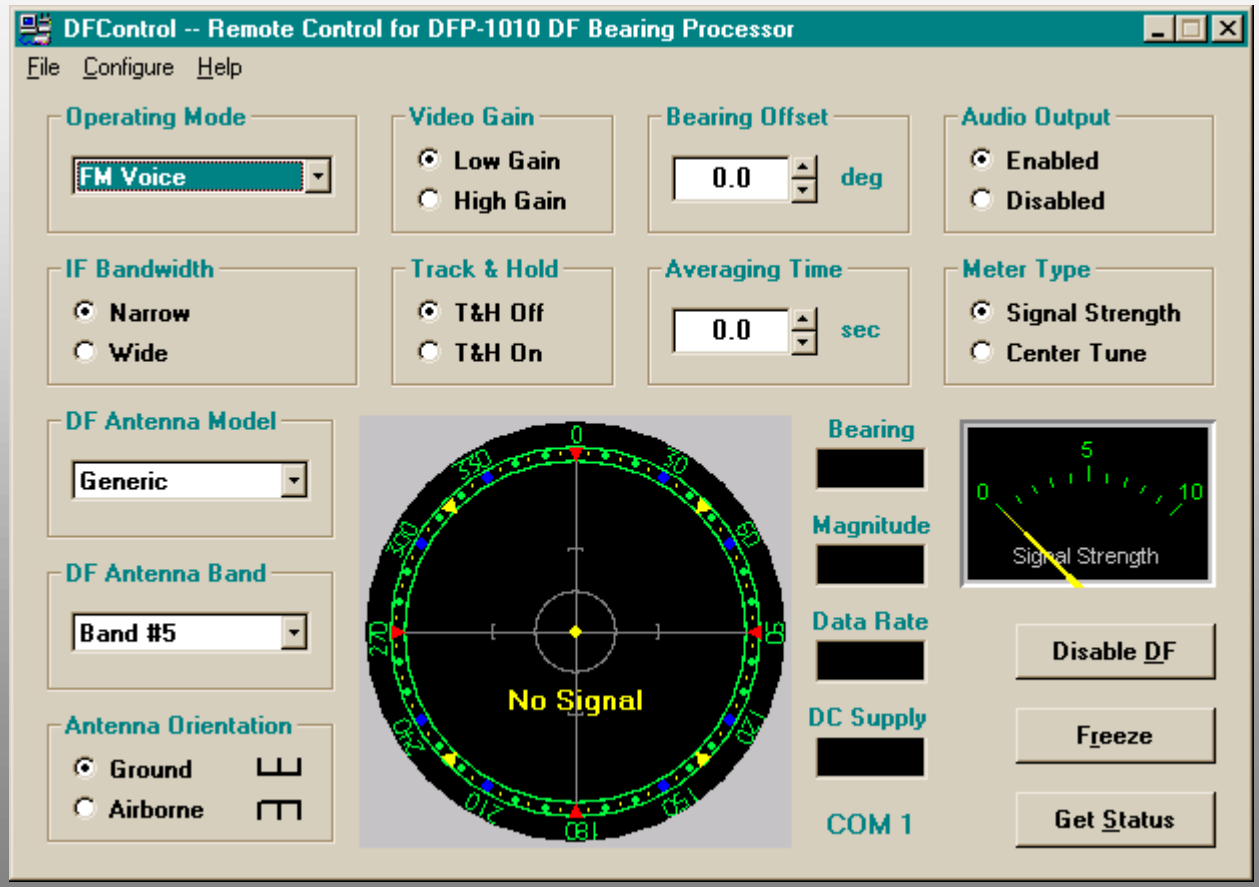
Software Control for the Receiver



Software Receiver Control in Discrete Search Mode.

Portable RFIMS Rack

Software Control for DF Hardware



RFIMS

Signals Analysis and Measurement Components

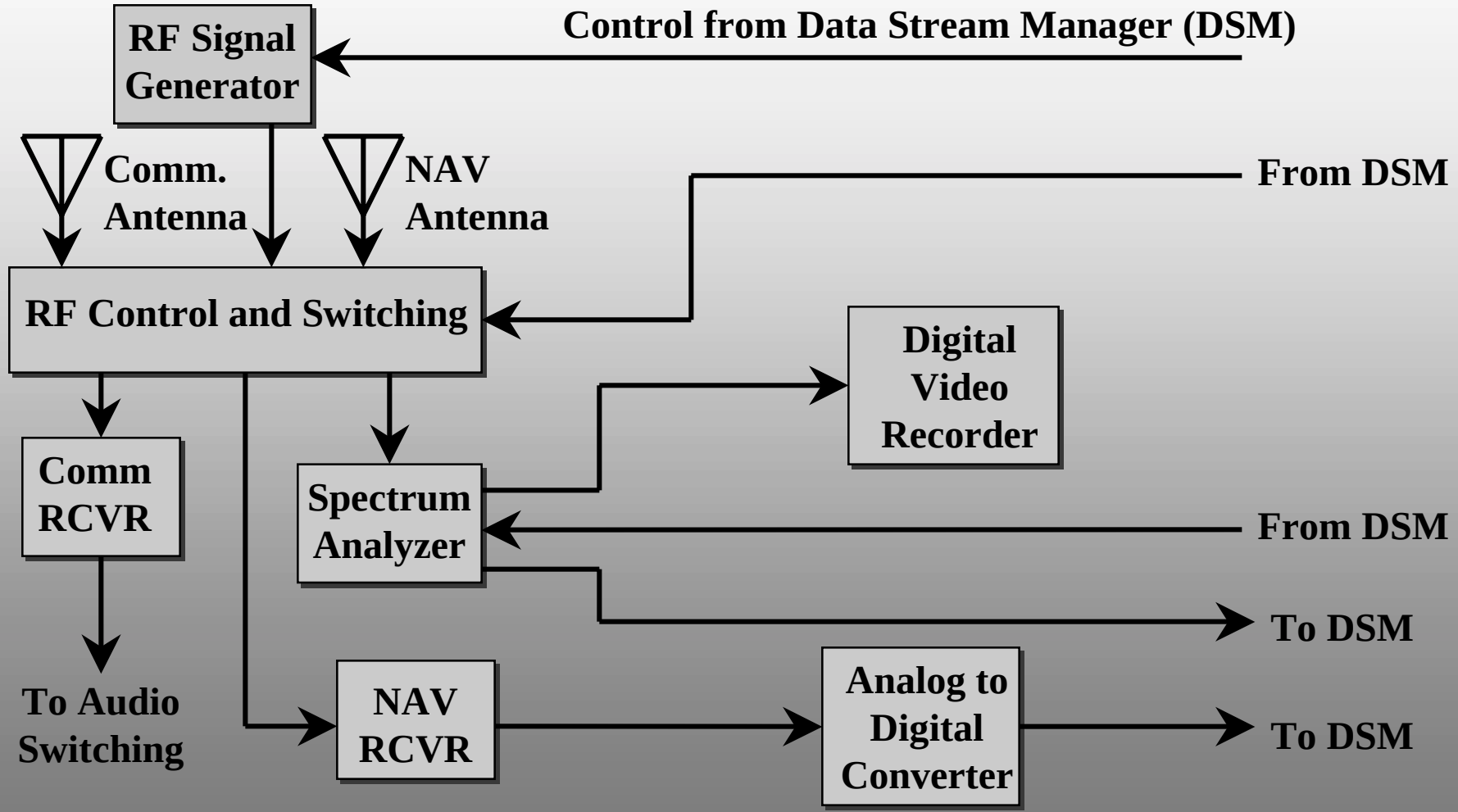
Rack Components

- ILS Localizer/VOR Receiver
- 2-Channel Intercom
- 16-Channel A/D Converter
- 2 Embedded Systems
- RF Control Unit

External Components

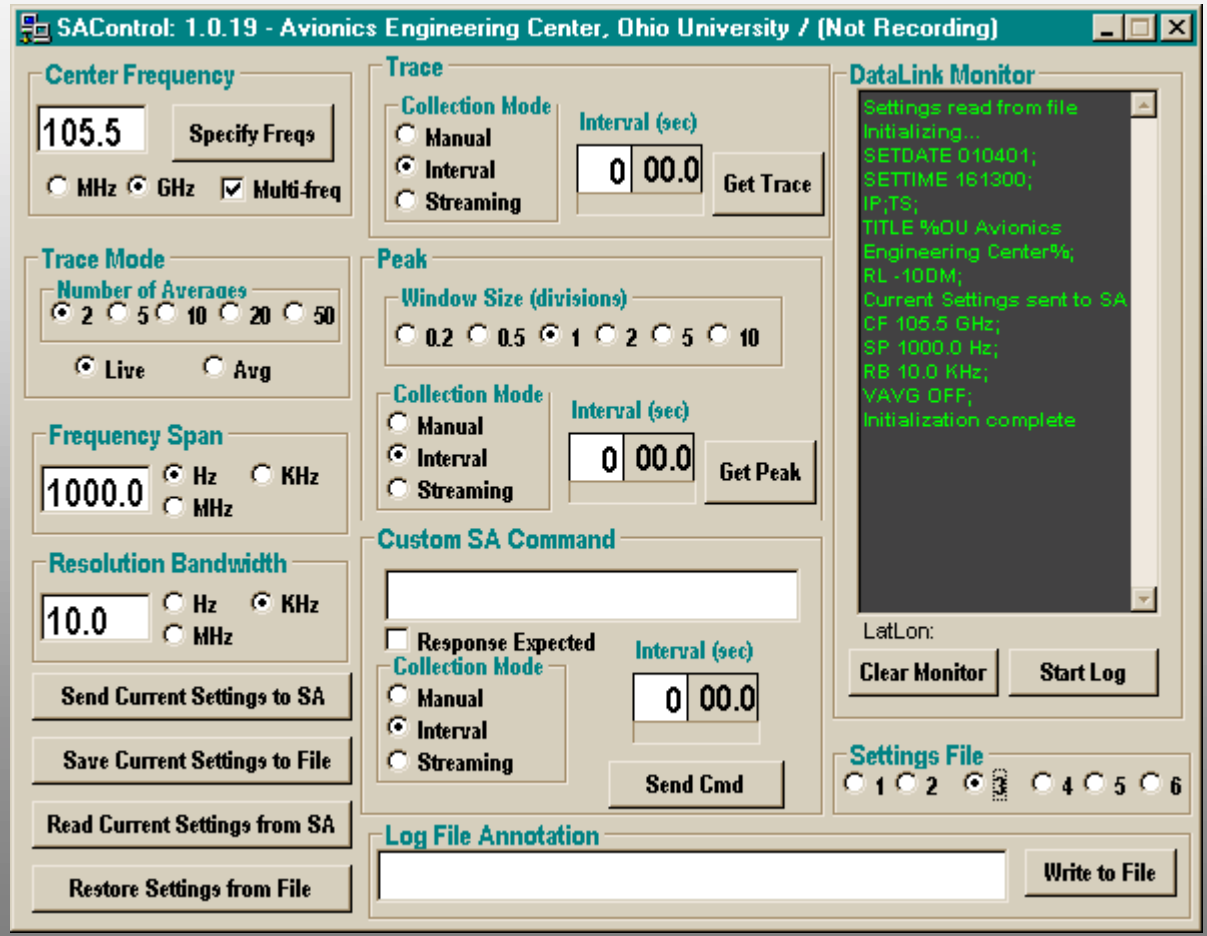
- Spectrum Analyzer
- RF Signal Generator
- Digital Video Recorder
- Digital Altimeter
- GPS Receiver
- 2 Portable Computers

Signal Analysis and Measurement

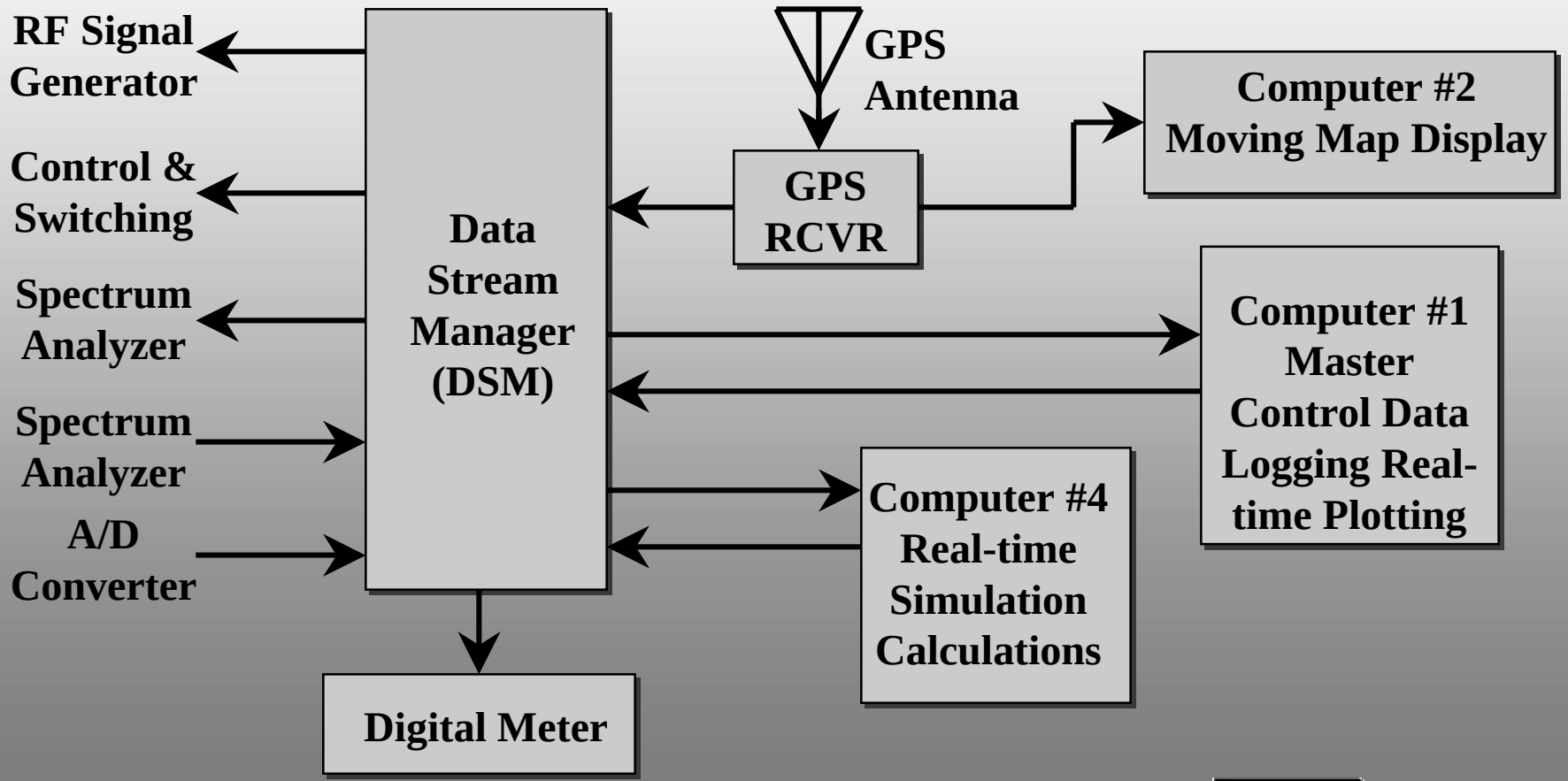


Spec A / Sig Gen / Receiver

Control for the Spectrum Analyzer



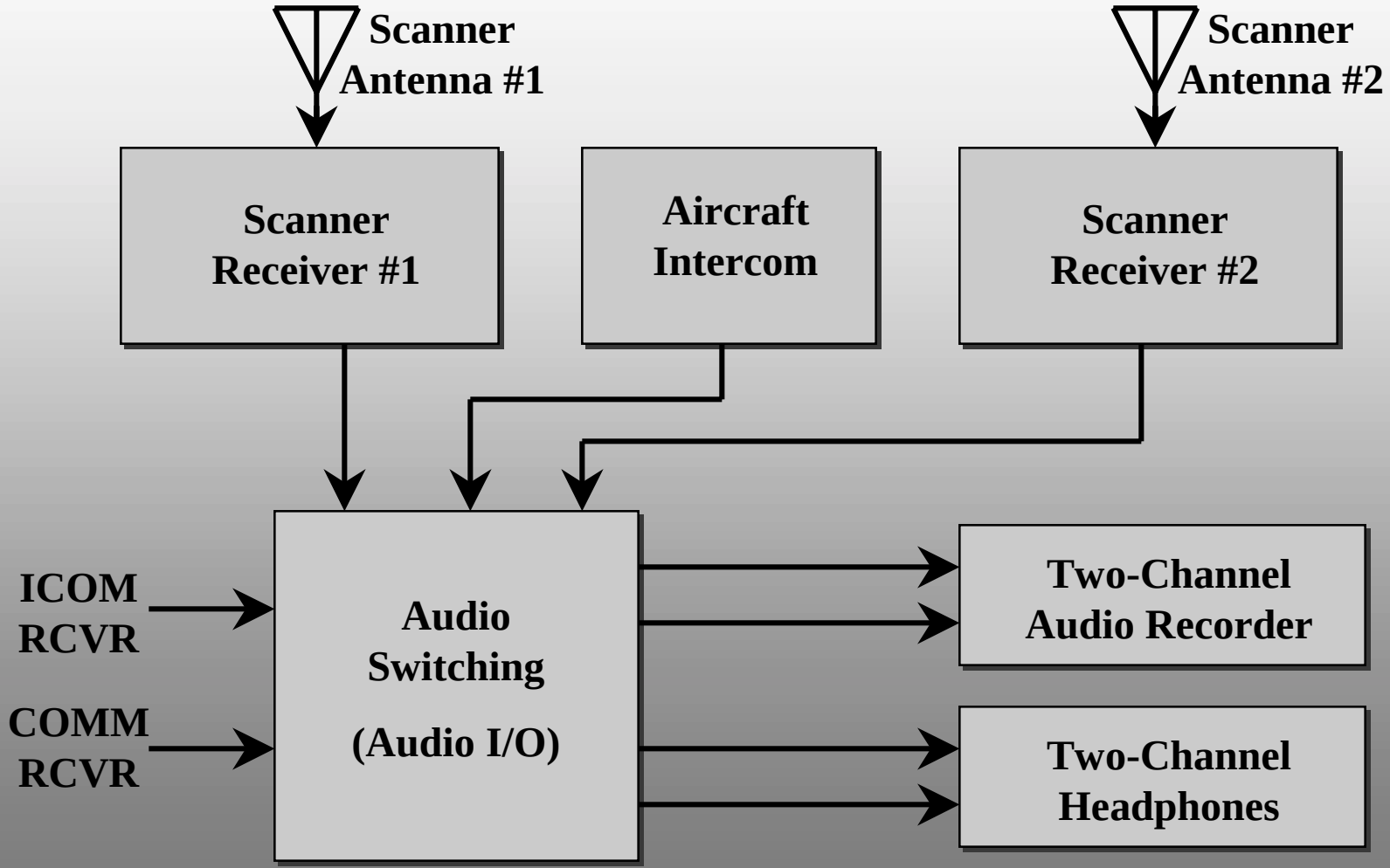
Signal Analysis and Measurement Computer Control



Moving Map Display

RFIMS Position

Audio Comparison & Recording



Airborne Missions

Signal Analysis and Measurement Missions:

- **Simulate Signals to determine if they are a possible RFI threat to NAS communication facilities**
- **Measure localizer signal to insure they are in proper working order.**
- **Fly grid patterns to determine antenna coverage of the VOR.**

Direction Finding Missions:

- **Determine and locate RF interference.**

Airborne DF Statistics

Direction Finding Missions:

- **100 % success rate for RF interference missions.**
- **50% resolved by Direction finding.**
- **50% resolved using Audio Comparison.**

Contact Information

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